Rehabilitation of Water Distribution Systems: Designing Renewal Projects (RV-11160)
1 hour course

Course Description

The average age of water distribution systems within the U.S. is between 50 to 100 years. This is right at the design life cycle of many systems, thus local water agencies are investing more and more in the rehabilitation of existing water distribution systems instead of the construction of new systems. This interactive online course will go through some of the key technical guidelines and standards for designing rehabilitation projects within the US. Some of these guidelines include AWWA, ANSI, ASTM and ASME standards. At the end of this course Contractors, Engineers, Water System Operators and Architects will be able to determine applicable design and QA/QC guidelines for common water distribution rehabilitation methods.

Course Objectives

By the end of this course, you will be able to:

- Identify the four classes of rehabilitation designs for water distribution systems from AWWA M28
- Describe at least 4 ASTM Standards used to test rehabilitation systems
- Given a specific rehabilitation technology, identify at least one applicable installation standard that safeguards the public's health, safety and welfare
- Given a specific rehabilitation technology, identify the applicable short-term QA/QC standard

Introduction – 5 minutes

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- Course Overview

Rehabilitation Design – 20 minutes

The average age of water distribution systems within the U.S. is between 50 to 100 years. This is right at the design life cycle of many systems; thus, local water agencies are investing more and more in the rehabilitation of existing water distribution systems instead of the construction of new systems. This course will provide a review existing design concepts and QA/QC requirements for the renewal of water distribution systems.

- Overview
- Classes of Rehabilitation
    - Non-structural Class One
    - Semi-structural Class Two
    - Semi-structural Class Three
    - Full Structural Class Four

Minimum Requirements and Standards – 20 minutes

Specific minimum requirements or standards for all types of pipes have been established and published by the American Water Works Association to ensure adequate and consistent quality of water mains. These standards, which cover methods for design, manufacture, suitability for contact with potable water, and installation in detail may be used for specifying pipe or liners for specific applications.

- Pipe Characteristics
    - Internal pressure
    - Tensile strength
    - Flexural strength
    - Pipe sheer

- Pressure and Stiffness Ratings
- Durability and Corrosion
- Smoothness of Inner Surface
- Ease of Tapping and Repair
- Water Quality Maintenance
- ASTM Standards

Installation Standards – 5 minutes

There are guidelines to help with the installation of renewal or rehabilitation projects. These installation standards vary from the different renewal techniques. The AWWA (or the American Water Works Association) M28 Manual provides a comprehensive list of installation standards.

- Overview

QA/QC Requirements – 10 minutes

Quality assurance and quality control procedures are required and specified in many cases by the utility agencies and basic requirements are included in the product and process specifications developed by AWWA, ASTM, and vendor organizations. Assurance in the form of test certificates can be provided by the manufacturer or by the licensed seller of the products.

- Quality Assurance and Quality Control
- Short-Term Quality Monitoring
- Long-Term Quality Monitoring

Conclusion – 5 minutes

The main takeaway is that short-term QA/QC occurs during the design and construction phase, while long-term quality control occurs during the operations phase of the project. Keep this in mind when developing designs and specifications for your next water renewal and rehabilitation project.

- Summary

Resources

- References